ELSEVIER

Environmental Pollution 110 (2000) III–XVI

ENVIRONMENTAL POLLUTION

www.elsevier.com/locate/envpol

Papers Published in Volumes 107–110

CONTENTS OF VOLUME 107

Number 1

1 Quantifying simultaneous fluxes of ozone, carbon dioxide and water vapor above a subalpine forest ecosystem
K.F. ZELLER, N.T. NIKOLOV (USA)
Eddy covariance measurements from over a spruce-fir forest are presented and suggestions for improved methods are discussed

21 Lead exposure of small herbivorous vertebrates from atmospheric pollution
J.A. KÅLÅS, E. STEINNES, S. LIERHAGEN (Norway)
Long range transport appeared to be the main source of Pb in two bird species and a species of hare

31 Passive sampling of ambient, gaseous air pollutants: an assessment from an ecological perspective
S.V. KRUPA (USA), A.H. LEGGE (Canada)
The use of passive samplers for gaseous air pollutants has advantages and disadvantages that require careful consideration

47 Evidence of endocrine disruption in clams—*Ruditapes decussata*—transplanted to a tributyltin-polluted environment
Y. MORCILLO, C. PORTE (Spain)

53 Polychlorinated biphenyls in diseased lesser black-backed gull (*Larus fuscus fuscus*) chicks from the Gulf of Finland
M. HARIO, K. HIMBERG, T. HOLLMÉN, E. RUDBÄCK (Finland)

61 An assessment of spatial and temporal variation of sulfur dioxide levels over Istanbul, Turkey
M. TAYANÇ (Turkey)

71 Response types in Collembola towards copper in the microenvironment
J. FILSER, R. WITTMANN, A. LANG (Germany)

79 Detoxification and amelioration of heavy-metal contaminated forest soils by means of liming and fertilisation
J. DEROME (Finland)

89 Responses of spruce seedlings (*Picea abies*) to exhaust gas under laboratory conditions — I plant–insect interactions
E.-L. VISKARI, J. SURAKKA, P. PASANEN (Finland), A. MIRME (Estonia), S. KÖSSI, J. RUUSKANEN, J.K. HOLOPAINEN (Finland)

99 Responses of spruce seedlings (*Picea abies*) to exhaust gas under laboratory conditions — II ultrastructural changes and stomatal behaviour
E.-L. VISKARI, T. HOLOPAINEN, L. KÄRENLAMPI (Finland)

109 Growth and development of smooth bromegrass and tall fescue in TNT-contaminated soil
G. KRISHNAN, G.L. HORST, S. DARNELL, W.L. POWERS (USA)

117 Foliar injury, leaf gas exchange and biomass responses of black cherry (*Prunus serotina* Ehrh.) half-sibling families to ozone exposure
K.B. KOUTERICK, J.M. SKELLY, T.S. FREDERICKSEN, K.C. STEINER, T.E. KOLB, J.A. FERDINAND (USA)

127 Evaluating three trace metal contaminated sites: a field and laboratory investigation
P. MURRAY, Y. GE, W.H. HENDERSHOT (Canada)

137 Trace metal speciation and bioavailability in urban soils
Y. GE, P. MURRAY, W.H. HENDERSHOT (Canada)

145 Effect of immobilized microalgal bead concentrations on wastewater nutrient removal
N.F.Y. TAM, Y.S. WONG (Hong Kong)

153 Solubility of lead, zinc and copper added to mineral soils
C.E. MARTÍNEZ, H.L. MOTTO (USA)

159 Lead poisoning of passerines at a trap and skeet range
N.B. VYAS, J.W. SPANN, G.H. HEINZ, W.N. BEYER, J.A. JAQUETTE, J.M. MENGELKOCH (USA)

167 Obituary

169 Corrigendum

171 Corrigendum

173 **Selected bibliography**

Number 2

Special Issue: **Bioremediation of Contaminated Soil and Groundwater**

Guest Editor: Martin Romantschuk

177 Preface
M. ROMANTSCHUK

179 Means to improve the effect of in situ bioremediation of contaminated soil: an overview of novel approaches
M. ROMANTSCHUK, I. SARAND, T. PETÄNEN, R. PELTOLA, M. JONSSON-VIHANNE, T. KOIVULA, K. YRJÄLÄ, K. HAAHTELA (Finland)
How to increase the efficiency and reproducibility of bacterial degradation of organic pollutants is reviewed

187 On-site biological remediation of contaminated groundwater: a review
J.H. LANGWALDT, J.A. PUHAKKA (Finland)
Many types of bioreactors have been widely used, but their use is limited by high operational costs

199 Anaerobic decomposition of halogenated aromatic compounds
M.M. HÄGGBLOM, V.K. KNIGHT, L.J. KERKHOF (USA)
Halogenated aromatic compounds are biodegradable in various redox conditions

209 Anaerobic transformations and bioremediation of chlorinated solvents
J.F. FERGUSON, J.M.H. PIETARI (USA)
Anaerobic transformations of chlorinated aliphatic compounds include substitutive and reductive reactions, carried out abiologically, catalyzed by biological products, or by live organisms

217 Biomarkers for monitoring efficacy of bioremediation by microbial inoculants
J.K. JANSSON (Sweden), K. BJÖRKLÖF (Finland), A.M. ELVANG (Sweden), K.S. JØRGENSEN (Finland)
When adapted or genetically modified bacteria are used in bioaugmentation of contaminated sites bioluminescence and fluorescence genes can be used to track the bacteria in situ

225 Genetic engineering in the improvement of plants for phytoremediation of metal polluted soils
S. KÄRENLAMPI (Finland), H. SCHAT (Netherlands), J. VANGRONSVELD (Belgium), J.A.C. VERKLEIJ (Netherlands), D. VAN DER LELIE, M. MERGEAY (Belgium), A.I. TERVAHAUTA (Finland)
Plants can be used for phyto-extraction of heavy metals from polluted soil, with the possibility that genetic engineering may increase efficacy

233 Decomposer animals and bioremediation of soils
J. HAIMI (Finland)
Soil animals do not themselves degrade soil contaminants, but they do have an important indirect role in these processes performed by microbes

239 Evaluation of the *Galega–Rhizobium galegae* system for the bioremediation of oil-contaminated soil
L. SUOMINEN, M.M. JUSSILA, K. MÄKELÄINEN, M. ROMANTSCHUK, K. LINDSTRÖM (Finland)
Nitrogen-fixing plants provide a supply of nitrogen in addition to carbon sources to bacteria, while bacteria protect the plants from toxic effects

245 Bioremediation of petroleum hydrocarbon-contaminated soil by composting in biopiles
K.S. JØRGENSEN, J. PUUSTINEN, A.-M. SUORTTI (Finland)
Composting is an efficient method that relies on added matrix material and on mixing/aeration, but not on addition of microbial inoculum

255 Evaluation of ecological disturbance and intrinsic bioremediation potential of pulp mill-contaminated lake sediment using key enzymes as probes
C. WITTMANN, K.P. SUOMINEN, M.S. SALKINOJA-SALONEN (Finland)
A novel application of a new method is presented whereby slices of sediment are evaluated for the presence of ten different enzymes, using substrates that generate fluorescent methylumbelliferyl (MUF) upon hydrolysis

Number 3

Commentary

263 Chromium occurrence in the environment and methods of its speciation
J. KOTAŚ, Z. STASICKA (Poland)
Upland plant species may be used as biomonitors of nitrogen deposition

Research Papers

285 An experimental soft-release of oil-spill rehabilitated American coots (*Fulica americana*): I. Lingering effects on survival, condition and behavior
D.W. ANDERSON, S.H. NEWMAN, P.R. KELLY, S.K. HERZOG, K.P. LEWIS (USA)
The long-term effects of oil-spilled rehabilitation on American coots is determined

295 An experimental soft-release of oil-spill rehabilitated American coots (*Fulica americana*): II. Effects on health and blood parameters
S.H. NEWMAN, D.W. ANDERSON, M.H. ZICCARDI, J.G. TRUPKIEWICZ, F.S. TSENG, M.M. CHRISTOPHER, J.G. ZINKL (USA)
Blood analysis, coupled with post-release survival data, may help explain increased mortality of oiled and rehabilitated birds

305 Norway spruce and spruce shoot aphid as indicators of traffic pollution
E.-L. VISKARI, S. KÖSSI, J.K. HOLOPAINEN (Finland)
The response of Norway spruce seedlings to roadside pollutants and aphids is described

315 Interactive effects of temperature and heavy metal stress on the growth and some biochemical compounds in wheat seedlings
I. ÖNCEL, Y. KELEŞ, A.S. ÜSTÜN (Turkey)
Interactions between temperature and heavy metal stress and two wheat cultivars were determined

321 Biomonitoring of airborne metals in urban environments: new tracers of vehicle emission, in place of lead
F. MONACI, F. MONI, E. LANCIOTTI, D. GRECHI, R. BARGAGLI (Italy)
Barium and zinc, rather than lead, are suggested as effective tracers of automotive traffic

329 Life-cycle phases of a zinc- and cadmium-resistant ecotype of *Silene vulgaris* in risk assessment of polymetallic mine soils
W.H.O. ERNST, H.J.M. NELISSEN (Netherlands)
Life cycle studies with plants are better than short-term exposures for risk assessments for heavy metals in soils

339 Spatial distribution of tropospheric ozone in western Washington, USA
S.M. COOPER, D.L. PETERSON (USA)
Ozone concentrations in western Cascade Mountains and Columbia River Gorge of Washington State (USA) are considerably greater than in upwind urban locations

349 Screening of bean cultivars for their response to ozone as evaluated by visible symptoms and leaf chlorophyll fluorescence
L. GUIDI, R. DI CAGNO, G.F. SOLDATINI (Italy)
A significant correlation was found between chlorophyll content and visible injury symptoms

357 Germination, growth and gas exchange of selected boreal forest seedlings in soil containing oil sands tailings
S. RENAULT, J.J. ZWIAZEK, M. FUNG, S. TUTTLE (Canada)
Oil sands tailings modify soil chemistry, texture and structure and may result in phytotoxicity

367 Can the foliar nitrogen concentration of upland vegetation be used for predicting atmospheric nitrogen deposition? Evidence from field surveys
W.K. HICKS, I.D. LEITH, S.J. WOODIN, D. FOWLER (UK)
Upland plant species may be used as biomonitors of nitrogen deposition

377 Vertical distribution of Cd, Pb and Zn in soils near smelters in the North of France
T. STERCKEMAN, F. DOUAY, N. PROIX, H. FOURRIER (France)
Mobility of the metals was classified in the order Cd›Pb›Zn

391 Adsorption of phenol by bentonite
F.A. BANAT, B. AL-BASHIR, S. AL-ASHEH, O. HAYAJNEH (Jordan)
Factors affecting the adsorption of phenol by bentonite were investigated

399 Laboratory study on the interaction between herbicides and sediments in water systems
G.-G. YING, B. WILLIAMS (Australia)
Sorption of herbicides on sediments may protect them from degradation in water

407 Lichen responses to short-term transplantation in Desierto de los Leones, Mexico City
A. ZAMBRANO, T.H. NASH III (USA)
Short term exposure of transplanted lichens near Mexico City resulted in chlorophyll degradation, possibly caused by ozone

413 Root versus canopy uptake of heavy metals by birch in an industrially polluted area: contrasting behaviour of nickel and copper
M.V. KOZLOV, E. HAUKIOJA (Finland), A.V. BAKHTIAROV, D.N. STROGANOV, S.N. ZIMINA (Russia)
Nickel and copper leaf contamination was similar, but only nickel was translocated from roots to shoots

421 Response of needle sulphur and nitrogen concentrations of Scots pine versus Norway spruce to SO_2 and NO_2
S. MANNINEN, S. HUTTUNEN (Finland)
Responses of mature Scots pine to SO_2 and NO_2 is different from Norway spruce and Scots pine seedlings responses are different than mature Scots pine

437 Comparative bioavailability of trace metals using three filter-feeder organisms in a subtropical coastal environment (Southeast Gulf of California)
J.R. RUELAS-INZUNZA, F. PÁEZ-OSUNA (México)
Different results were obtained when an oyster, a mussel and a barnacle were used as biomonitors of trace metals

445 Kinetics of the development of imposex in transplanted adult dogwhelks, *Nucella lapillus*
I.M. DAVIES (UK)

451 Determination of cadmium, zinc, copper, chromium and arsenic in crude oil cargoes
J.B. STIGTER, H.P.M. DE HAAN, R. GUICHERIT, C.P.A. DEKKERS, M.L. DAANE (Netherlands)

465 The effect of ozone on below-ground carbon allocation in wheat
J.K. MCCRADY, C.P. ANDERSEN (USA)

473 Corrigendum

475 **Selected bibliography**

479 Contents of Volume 107

CONTENTS OF VOLUME 108

Number 1

Special Issue: **Non-extractable Residues in Soil and Sediments: Characterisation and Environmental Significance**

Guest Editors: K.C. Jones, B. Gevao, C. Mordaunt, G. Northcott and K.T. Semple

1 Editorial: Introductory remarks to the Special Issue
K.C. JONES, B. GEVAO, C. MORDAUNT, G. NORTHCOTT, K.T. SEMPLE (UK)

3 Bound pesticide residues in soils: a review
B. GEVAO, K.T. SEMPLE, K.C. JONES (UK)
The current state of knowledge regarding the formation and biological/environmental significance of bound pesticide residues in soils is reviewed.

15 Bound residues of organic compounds in the soil: the significance of pesticide persistence in soil and water: a European regulatory view
A. CRAVEN (UK)
European regulations and approaches to the issues of pesticide persistence and bound residues are discussed.

Commentary

19 Experimental approaches and analytical techniques for determining organic compound bound residues in soil and sediment
G.L. NORTHCOTT, K.C. JONES (UK)
This paper reviews experimental approaches and analytical techniques for determining organic compound residues in soil and sediment.

45 Formation and long-term fate of non-extractable residues in outdoor lysimeter studies
P. BURAUEL, F. FÜHR (Germany)
Detailed long-term data from field lysimeter experiments are presented, to quantify the rate and magnitude of non-extractable residue formation.

53 Characterisation of soil-bound residue fractions of the fungicide dithianon by gel permeation chromatography and polyacrylamide gel electrophoresis
U. WANNER, P. BURAUEL, F. FÜHR (Germany)
Detailed studies are described which characterise the soil bound residue fractions of a particular fungicide.

61 Formation and release of residues of the ^{14}C-labelled herbicide isoproturon and its metabolites bound in model polymers and in soil
I. SCHEUNERT, S. REUTER (Germany)
Detailed studies on the formation and release of Isoproturon and its metabolites are described.

69 Slow desorption of PCBs and chlorobenzenes from soils and sediments: relations with sorbent and sorbate characteristics
G. CORNELISSEN, K.A. HASSELL, P.C.M. VAN NOORT, R. KRAAIJ, P.J. VAN EKEREN, C. DIJKEMA, P.A. DE JAGER, H.A.J. GOVERS (Netherlands)
The kinetics of slow desorption is reported for a range of compounds in a range of soils/sediments and the data interpreted with respect to the nature of sorbent/sorbate interactions.

81 Desorption kinetics of neutral hydrophobic organic compounds from field-contaminated sediment
A.T. KAN, W. CHEN, M.B. TOMSON (USA)
Chemical release rates of neutral hydrophobic organic compounds are measured and biphasic desorption phenomena observed.

91 Tracing the transformation of labelled [1-^{13}C]phenanthrene in a soil bioreactor
H.H. RICHNOW, E. ANNWEILER, M. KONING, J.-C. LÜTH, R. STEGMANN, C. GARMS, W. FRANCKE, W. MICHAELIS (Germany)
Detailed experiments are described in which the transformation of ^{13}C-labelled phenanthrene is tracked in a soil bioreactor.

103 Bioavailability of persistent organic pollutants in soils and sediments—a perspective on mechanisms, consequences and assessment
B.J. REID, K.C. JONES, K.T. SEMPLE (UK)
Factors involved in the ageing phenomenon are reviewed and the implications for bioavailability discussed.

113 Bioavailability in soil or sediment: exposure of different organisms and approaches to study it
D. SIJM, R. KRAAIJ, A. BELFROID (Netherlands)
This paper considers the pathways of exposure and other factors which control the concentration of organic contaminants in biota, together with biomemetic approaches to study bioavailability.

IV Instructions to Authors

Number 2

121 Detection and localization of aluminum and heavy metals in ectomycorrhizal Norway spruce seedlings
I. BRUNNER, B. FREY (Switzerland)
Heavy metals were found in different locations in mycorrhizae on seedlings of Norway spruce.

129 The effects of oil spill and clean-up on dominant US Gulf coast marsh macrophytes: a review
S.R. PEZESHKI, M.W. HESTER, Q. LIN, J.A. NYMAN (USA)
This review should be useful in guiding future research to improve oil spill response efficiency.

141 Seedling insensitivity to ozone for three conifer species native to Great Smoky Mountains National Park
H.S. NEUFELD, E.H. LEE, J.R. RENFRO, W.D. HACKER (USA)
Ambient concentrations of ozone had little effect on seedlings of three species of conifers commonly found in Great Smoky Mountains National Park.

153 Volcanic and anthropogenic contribution to heavy metal content in lichens from Mt. Etna and Vulcano island (Sicily)
D. VARRICA, A. AIUPPA, G. DONGARRÀ (Italy)
Lichens were used to determine element concentrations in relation to natural or anthropogenic sources.

163 Polycyclic aromatic hydrocarbons in the sediments of the South China Sea
G.-P. YANG (People's Republic of China)
Concentrations of PAHs in sediments were correlated to sediment organic carbon content.

173 *Plagiochasma appendiculatum* as a biotest for water quality assessment
S. GHATE, S.B. CHAPHEKAR (India)
Thallus deterioration of the liverwort Plagiochasma *may be a simple biomonitoring parameter for water quality.*

183 Sorption and desorption of the diketonitrile metabolite of isoxaflutole in soils
S. MITRA, P.C. BHOWMIK, B. XING (USA)
Behavior of a new pre-emergence corn herbicide in five different soils was compared.

191 Response of the fish populations of the River Don in South Yorkshire to water quality and habitat improvements
S. AMISAH, I.G. COWX (UK)
Despite some improvements in water quality, fish stocking programs have been ineffective.

201 Monitoring of heavy metal deposition in Northern Italy by moss analysis
R. GERDOL, L. BRAGAZZA, R. MARCHESINI, R. ALBER, L. BONETTI, G. LORENZONI, M. ACHILLI, A. BUFFONI, N. DE MARCO, M. FRANCHI, S. PISON, S. GIAQUINTA, F. PALMIERI, P. SPEZZANO (Italy)
Moss samples were used to determine heavy metal deposition on the mountains of Northern Italy.

209 Lead impact on nutrition, energy reserves, respiration and stress protein (hsp 70) level in *Porcellio scaber* (Isopoda) populations differently preconditioned in their habitats
T. KNIGGE, H.-R. KÖHLER (Germany)
The impact of lead on food consumption and behavior of the woodlouse was determined.

219 Biodegradation and biosorption of acid anthraquinone dye
G.M. WALKER (UK), L.R. WEATHERLEY (New Zealand)
Three strains of bacteria were found to decolonize an acid anthraquinone dye used in a carpet mill.

225 Organochlorine and mercury contamination of little terns (*Sterna albifrons*) breeding at the western Baltic Sea, 1978–96
S. THYEN, P.H. BECKER, H. BEHMANN (Germany)
Analysis of PCBs, DDT, HCB, HCHs and mercury were carried out from 1978–1996.

239 Spatial pattern of ozone injury in Aleppo pine related to air pollution dynamics in a coastal–mountain region of eastern Spain
M.J. SANZ, V. CALATAYUD, E. CALVO (Spain)
Distribution of needle injury of Aleppo pine caused by ozone correlated with ozone distribution.

249 Mercury and cadmium in common cormorants (*Phalacrocorax carbo*)
K. SAEKI, Y. OKABE, E.-Y. KIM, S. TANABE, M. FUKUDA, R. TATSUKAWA (Japan)
Mercury and cadmium concentrations in juvenile and adult cormorants from Tokyo and Like Biwa are compared.

257 Use of tritium to predict soluble pollutants transport in Ebro River waters (Spain)
LI. PUJOL, J.A. SANCHEZ-CABEZA (Spain)
Tritium was used as a radiotracer to determine the longitudinal dispersion coefficient and velocity of river water.

271 Genotoxicity of two novel pesticides for the earthworm, *Eisenia fetida*
Y. ZANG, Y. ZHONG, Y. LUO, Z.M. KONG (People's Republic of China)
The earthworm "comet assay" is a rapid way to screen chemicals.

279 Temporal fluctuations of tributyltin in the bivalve *Venerupis decussata* at five stations in southwest Spain
J.L. GÓMEZ-ARIZA, I. GIRÁLDEZ, E. MORALES (Spain)
Good correlation was found between tributyltin bivalve contents and water concentration of TBT.

291 Acute and chronic impacts caused by aromatic hydrocarbons on bacterial communities at Boa Viagem and Forte do Rio Branco Beaches, Guanabara Bay, Brazil
M.A.C. CRAPEZ, Z.T. TOSTA, M. das G.S. BISPO, D.C. PEREIRA (Brazil)
Bacterial communities behaved differently under acute and chronic impacts.

297 Leaf morphology and ozone sensitivity of two open pollinated genotypes of black cherry (*Prunus serotina*) seedlings
J.A. FERDINAND, T.S. FREDERICKSEN, K.B. KOUTERICK, J.M. SKELLY (USA)

303 Uptake and excretion of nickel and copper by leaf-mining larvae of *Eriocrania semipurpurella* (Lepidoptera: Eriocraniidae) feeding on contaminated birch foliage
M.V. KOZLOV, E. HAUKIOJA (Finland), E.F. KOVNATSKY (Russian Federation)

311 **Selected bibliography**

Number 3

Part Special Issue: **The 7th International Plant Pathology Congress (ICPP)**

Guest Editor: S. Chakraborty

315 Editorial: Introduction
S. CHAKRABORTY (Australia)

317 Climate change: potential impact on plant diseases
S. CHAKRABORTY (Australia), A.V. TIEDEMANN (Germany), P.S. TENG (Philippines)
Climate change effects on plant disease incidence and severity are largely unknown.

327 Ozone/biotic disease interactions: molecular biomarkers as a new experimental tool
H. SANDERMANN JR (Germany)
Stress transcript, proteins and metabolites have been identified as ozone effects biomarkers that affect plant disease incidence.

333 Global networking for assessment of impacts of global change on plant pests
H. SCHERM (USA), R.W. SUTHERST (Australia), R. HARRINGTON, J.S.I. INGRAM (UK)
Several collaborative research networks that focus on prediction of climate change effects on plant disease are discussed.

343 Stratospheric ozone depletion, UV-B radiation and crop disease
N.D. PAUL (UK)
Ultraviolet-B radiation (UV-B: 290-315 nm) effects on plant/pathogen interactions have been studied in only a few pathosystems.

357 Interactive effects of elevated ozone and carbon dioxide on growth and yield of leaf rust-infected versus non-infected wheat
A.v. TIEDEMANN, K.H. FIRSCHING (Germany)
Determination of ozone effects on crops in the field should also include fungal diseases and ambient carbon dioxide levels as contributing factors.

365 Climatic mapping to identify high-risk areas for *Cylindrocladium quinqueseptatum* leaf blight on eucalypts in mainland South East Asia and around the world
T.H. BOOTH, T. JOVANOVIC, K.M. OLD, M.J. DUDZINSKI (Australia)
Climatic mapping programs can be used to identify high risk areas for a wide-spread fungal pathogen

373 Simulating uncertainty in climate–pest models with fuzzy numbers
H. SCHERM (USA)
Uncertainty in climate change projections must be reduced before reliable impact assessments can be achieved.

381 Production and dispersal of *Colletotrichum gloeosporioides* spores on *Stylosanthes scabra* under elevated CO_2
S. CHAKRABORTY, I.B. PANGGA, J. LUPTON, L. HART, P.M. ROOM, D. YATES (Australia)
Twice ambient (700 ppm) carbon dioxide concentrations increased plant canopy size which resulted in more disease.

389 Estimating disease risk at the whole plant level with General Circulation Models
R.C. SEEM, R.D. MAGAREY, J.W. ZACK, J.M. RUSSO (USA)
Methods have been developed to scale weather information from the global down to the plant scale.

Regular Papers

397 Retention of organic and inorganic chemicals by the drainage/supply piping material
K. LI, W.A. TORELLO, B. XING (USA)
Draining and water supply piping material for golf greens can absorb organic chemicals used in golf courses.

405 Influence of polyacrylamide application to soil on movement of microorganisms in runoff water
R.E. SOJKA, J.A. ENTRY (USA)
Polyacrylamide used in irrigation reduces soil erosion and pathogen transport.

413 PAHs associated with the leaves of three deciduous tree species. I — Concentrations and profiles
M. HOWSAM, K.C. JONES, P. INESON (UK)
Deposition of particle-bound PAHs to tree leaves is greatest at the edges of woodlands.

425 Anomalies on capture nets of *Hydropsyche slossonae* larvae (Trichoptera; Hydropsychidae) following a sublethal chronic exposure to cadmium
L. TESSIER, J.L. BOISVERT (Canada), L.B.-M. VOUGHT, J.O. LACOURSIÈRE (Sweden)
Capture net anomalies of hydropsychid larvae may reflect sublethal toxicity of metals.

439 Application of a stochastic, Weibull probability generator for replacing missing data on ambient concentrations of gaseous pollutants
M. NOSAL, A.H. LEGGE (Canada), S.V. KRUPA (USA)
A stochastic Weibull frequency distribution, probability generator was tested and applied for replacing missing data on hourly atmospheric concentrations of trace gases. The method provided highly accurate and realistic results for the replacement of as many as 100 missing values on either side of a measured data sub-set.

447 Distribution of mercury in the organs and tissues of five toothed-whale species of the Mediterranean
J.P. FRODELLO, M. ROMÉO, D. VIALE (France)
The liver appeared to be the preferential storage organ for mercury accumulation for all species evaluated.

453 Heavy metals in the fine fraction of coastal sediments from Baja California (Mexico) and California (USA)
J.A. VILLAESCUSA-CELAYA, E.A. GUTIÉRREZ-GALINDO, G. FLORES-MUÑOZ (Mexico)
Heavy metals in sediments in Baja California, Mexico, were determined.

463 **Selected bibliography**

467 Contents of Volume 108

IV Instructions to Authors

CONTENTS OF VOLUME 109

Number 1

1 Heavy metal concentrations in surface sediments in a nearshore environment, Jurujuba Sound, Southeast Brazil
J.A. BAPTISTA NETO (Brazil), B.J. SMITH, J.J. McALLISTER (UK)
Rapid urbanisation has resulted in increased metal concentrations in surface sediments.

11 Surface water acidification in the South Pennines I. Current status and spatial variability
C.D. EVANS, A. JENKINS (UK), R.F. WRIGHT (Norway)
Acidification of surface waters in the South Pennines is a continuing problem.

21 Surface water acidification in the South Pennines II. Temporal trends
C.D. EVANS, A. JENKINS (UK)
High levels of nitrogen deposition may affect pH recovery in streams.

35 Effects of long-term contamination of DDT on soil microflora with special reference to soil algae and algal transformation of DDT
M. MEGHARAJ, D. KANTACHOTE, I. SINGLETON, R. NAIDU (Australia)
A long-term DDT-contaminated soil was screened for DDT residues and toxicity to microorganisms.

43 A new sensitive test based on yeast cells for studying environmental pollution
A. TERZIYSKA, L. WALTSCHEWA, P. VENKOV (Bulgaria)
Mutated yeast lines can be used for detection of environmental mutagenesis.

53 The acute toxicity of nickel to freshwater ciliates
P. MADONI (Italy)
A common freshwater ciliate species is a sensitive bioindicator of heavy metal pollution.

61 Organochlorine contamination in bird's eggs from the Danube Delta
S. AURIGI, S. FOCARDI (Italy), D. HULEA (Romania), A. RENZONI (Italy)
Levels of organochlorine in bird eggs are generally lower now than in 1982.

69 Phytotoxicity of cobalt, chromium and copper in cauliflower
J. CHATTERJEE, C. CHATTERJEE (India)
Factors affecting uptake and phytotoxicity of cobalt, chromium and copper in cauliflower are explored.

75 Revegetation of lagoon ash using the legume species *Acacia auriculiformis* and *Leucaena leucocephala*
K.C. CHEUNG, J.P.K. WONG (Hong Kong), Z.Q. ZHANG (People's Republic of China), J.W.C. WONG, M.H. WONG (Hong Kong)
Two leguminous tree species were capable of colonizing amended lagoon ash.

83 Microbial utilization and transformation of humic acid-like substances extracted from a mixture of municipal refuse and sewage sludge disposed of in a landfill
Z. FILIP (France), W. PECHER (Germany), J. BERTHELIN (France)
Humic acid-like structures do not play a role in long-term stabilization of landfill refuse.

91 Problems of quality designation in diffusely polluted urban streams — the case of Pymme's Brook, North London
H. FAULKNER, V. EDMONDS-BROWN, A. GREEN (UK)
Biological, sedimentological and bacterial parameters should all play a role in water quality assessment in urban streams.

109 Effects of beach sand properties, temperature and rainfall on the degradation rates of oil in buried oil/beach sand mixtures
A.P. ROWLAND, D.K. LINDLEY, G.H. HALL, M.J. ROSSALL, D.R. WILSON, D.G. BENHAM, A.F. HARRISON, R.E. DANIELS (UK)
Beach sands varied in their effectiveness in degrading buried oil.

119 Temporal and spatial variation in C, N, S and trace element contents in the leaves of *Quercus ilex* within the urban area of Naples
A. ALFANI, D. BALDANTONI, G. MAISTO, G. BARTOLI, A. VIRZO DE SANTO (Italy)
Foliar analysis of Quercus ilex*, an evergreen oak, were used to compose element concentrations in 1989 and 1996.*

131 Evaluation of lipid peroxidation as a toxicity bioassay for plants exposed to copper
A. BARYLA, C. LABORDE, J.-L. MONTILLET, C. TRIANTAPHYLIDÈS, P. CHAGVARDIEFF (France)
Chemical analysis of soils may not be representative of copper availability to plants.

137 Heavy contamination of a subsurface aquifer and a stream by livestock wastewater in a stock farming area, Wonju, Korea
J.-C. CHO, H.B. CHO, S.-J. KIM (South Korea)
Deep aquifers were heavily contaminated with infiltrated livestock wastewater.

147 Estimation of metal and organochlorine pesticide exposures and potential health threat by consumption of oysters in Taiwan
B.-C. HAN, W.-L. JENG, T.-C. HUNG, Y.-C. LING, M.-J. SHIEH, L.-C. CHIEN (Taiwan)
Human health risk from consuming oysters from 12 areas was determined.

157 Mercury levels in muscle of two fish species and sediments from the Cartagena Bay and the Ciénaga Grande de Santa Marta, Colombia
D. ALONSO, P. PINEDA, J. OLIVERO (Colombia), H. GONZÁLEZ (Cuba), N. CAMPOS (Colombia)
There are persistent effects of mercury pollution on sediments and fish in a tropical estuary.

165 Heavy metal concentrations in green-lipped mussels collected from Tolo Harbour and markets in Hong Kong and Shenzhen
C.K.C. WONG, R.Y.H. CHEUNG, M.H. WONG (Hong Kong)
Heavy metal concentrations in green-lipped mussels were determined.

173 **Selected bibliography**

Number 2

iii Editorial

177 Sensitivity of characteristic riverine insects, the caddisfly *Cyrnus trimaculatus* and the mayfly *Ephoron virgo*, to copper and diazinon
H.G. VAN DER GEEST, G.D. GREVE, A. KROON, S. KUIJL, M.H.S. KRAAK, W. ADMIRAAL (The Netherlands)
This study reports effects of two model toxicants on indigenous insect species from large European rivers.

183 Reversal of acidification in tributaries of the River Duddon (English Lake District) between 1970 and 1998
E. TIPPING, R. BETTNEY, M.A. HURLEY, F. ISGREN, J.B. JAMES, A.J. LAWLOR, S. LOFTS, E. RIGG, B.M. SIMON, E.J. SMITH, C. WOOF (UK)
Additional support is provided for evidence that a general reversal of acidification is occuring in the southwest part of the English Lake District.

193 The development of genetically inherited resistance to zinc in laboratory-selected generations of the earthworm *Eisenia fetida*
D.J. SPURGEON, S.P. HOPKIN (UK)
Zinc resistance in populations of the worm Eisenia fetida *was demonstrated.*

203 Container-grown tree seedling responses to sodium chloride applications in different substrates
O. FOSTAD, P.A. PEDERSEN (Norway)
Seedlings of two conifers and two deciduous trees were evaluated for tolerance to sodium chloride.

211 Copper resistance of *Calluna vulgaris* originating from the pollution gradient of a Cu–Ni smelter, in southwest Finland
S. MONNI, M. SALEMAA (Finland), C. WHITE (UK), E. TUITTILA, M. HUOPALAINEN (Finland)
Heather seedlings from seed collected at three locations did not differ appreciably in their measured responses to copper treatments.

221 The tolerance of *Empetrum nigrum* to copper and nickel
S. MONNI, M. SALEMAA (Finland), N. MILLAR (UK)
Increasing copper and nickel concentration increased adverse effects on growth of Empetrum nigrum.

231 Strategies of heavy metal uptake by three plant species growing near a metal smelter
H. DAHMANI-MULLER, F. VAN OORT, B. GÉLIE, M. BALABANE (France)
Metal tolerance strategies of two metallophytes and one pseudometallophyte were assessed.

239 Factors influencing the total mercury and methyl mercury in the hair of the fishermen of Kuwait
N.B. AL-MAJED (Kuwait), M.R. PRESTON (UK)
Methyl mercury concentrations in human hair showed a positive correlation with fish consumed.

251 Acute toxicity and genotoxicity of aquatic hydrophobic pollutants sampled with semipermeable membrane devices
D. SABALIŪNAS (Sweden), J.R. LAZUTKA, I. SABALIŪNIENĖ (Lithuania)
The potential as well as some limitations of semipermeable membrane devices in monitoring the biological effects of organic pollutants has been demonstrated.

267 Heavy metal and other residues in feathers of laggar falcon *Falco biarmicus jugger* from six districts of Pakistan
P.A. MOVALLI (Italy)
The metal burden in falcon feathers may reflect contamination in a geographic area.

277 Biomarkers assessment in juvenile *Cyprinus carpio* exposed to waterborne cadmium
F.R. DE LA TORRE, A. SALIBIÁN, L. FERRARI (Argentina)
Sublethal Cd concentrations were stressful to carp.

283 The use of mosses and pine needles to detect persistent organic pollutants at local and regional scales
I. HOLOUBEK, P. KOŘÍNEK, Z. ŠEDA, E. SCHNEIDEROVÁ, I. HOLOUBKOVÁ, A. PACL, J. TŘÍSKA, P. CUDLÍN, J. ČSLAVSKÝ (Czech Republic)
Moss and pine needles were found to 'sample' and record spatial and temporal differences in a mixture of PAHs in air.

293 Gram stain index of a natural bacterial community at a nutrient gradient in the freshwater environment
H. SAIDA, T. MAEKAWA, T. SATAKE, Y. HIGASHI, H. SEKI (Japan)
Gram stain index suggested as an indicator of organic pollution in water.

303 Empty nests in the great tit (*Parus major*) and the pied flycatcher (*Ficedula hypoleuca*) in a polluted area
T. EEVA, M. OJANEN, O. RÄSÄNEN, E. LEHIKOINEN (Finland)
Air pollution may be involved in the 'empty nest' phenomenon for birds in the forest of Finland.

311 Ecological adaptation and acclimatization of natural freshwater phytoplankters with a nutrient gradient
Y. HIGASHI, H. SEKI (Japan)
Phytoplankton dynamics were followed in a nitrate gradient.

321 Oxidant stress, antioxidants and nitric oxide in traffic police of Hyderabad, India
Y. SURESH, M.M. SAILAJA DEVI, V. MANJARI (India), U.N. DAS (USA)
For traffic policemen in India, exposure to air pollutants can increase oxidant stress and decrease levels of antioxidants and nitric oxide.

327 Effect of sludge-processing mode, soil texture and soil pH on metal mobility in undisturbed soil columns under accelerated loading
B.K. RICHARDS, T.S. STEENHUIS, J.H. PEVERLY, M.B. MCBRIDE (USA)

347 Antimony accumulation in *Achillea ageratum*, *Plantago lanceolata* and *Silene vulgaris* growing in an old Sb-mining area
F. BARONI, A. BOSCAGLI, G. PROTANO, F. RICCOBONO (Italy)
Preliminary results indicate that these plants may be good bioindicators for antimony in soil.

353 Corrigendum

355 **Selected bibliography**

Number 3

Special Issue: **Risk Assessment for Ozone Effects on Vegetation in Europe**

Guest Editor: J. Fuhrer

359 Editorial: Introduction to the special issue on ozone risk analysis for vegetation in Europe
J. FUHRER (Switzerland)

361 Assessing vegetation exposure to ozone: properties of the AOT40 index and modifications by deposition modelling
J.-P. TUOVINEN (Finland)
On the basis of micrometeorological principles, the transition from the exposure index AOT40 to a flux-based approach for estimating ozone risks is described.

373 The exchange of ozone between vegetation and atmosphere: micrometeorological measurement techniques and models
L. GRÜNHAGE, H.-D. HAENEL, H.-J. JÄGER (Germany)
Current possibilities and limitations of experimental and modeling techniques to estimate ozone fluxes to vegetation are presented and discussed in the context of their use for ozone risk analysis.

393 Modelling of stomatal conductance and ozone flux of Norway spruce: comparison with field data
L.D. EMBERSON (UK), G. WIESER (Austria), M.R. ASHMORE (UK)
A model to estimate stomatal ozone uptake in relationship to plant phenology and environmental conditions is described and model predictions for Norway spruce show satisfactory agreement with measured data.

403 Modelling stomatal ozone flux across Europe
L.D. EMBERSON, M.R. ASHMORE, H.M. CAMBRIDGE (UK), D. SIMPSON (Norway), J.-P. TUOVINEN (Finland)
The stomatal flux of ozone for different types of vegetation is modelled on a European scale; differences in the spatial distribution between stomatal flux and the exposure index AOT40 indicate important implications for risk analysis.

415 Role of climate, crown position, tree age and altitude in calculated ozone flux into needles of *Picea abies* and *Pinus cembra*: a synthesis
G. WIESER (Austria), R. HÄSLER (Switzerland), B. GÖTZ, W. KOCH (Germany), W.M. HAVRANEK (Austria)
Based on the analysis of a set of field measurements, it is shown how stomatal conductance as the main limiting factor for ozone uptake in needles of Norway spruce depends on crown position, needle age, and altitude.

423 Ozone uptake by an evergreen forest canopy: temporal variation and possible mechanisms
T.N. MIKKELSEN, H. RO-POULSEN, K. PILEGAARD, M.F. HOVMAND, N.O. JENSEN, C.S. CHRISTENSEN, P. HUMMELSHOEJ (Denmark)
Field measurements demonstrate the control of ozone flux to an evergreen forest canopy by the physiological activity of the trees, and reveal the importance of ozone destruction by reaction with NO and terpenes as an additional ozone sink.

431 Seasonal ozone response of mature beech trees (*Fagus sylvatica*) at high altitude in the Bavarian forest (Germany) in comparison with young beech grown in the field and in phytotrons
M. BAUMGARTEN, H. WERNER, K.-H. HÄBERLE (Germany), L.D. EMBERSON (UK), P. FABIAN, R. MATYSSEK (Germany)
Leaf discoloration is shown to occur in mature beech trees at low and high elevation sites and young phytotron plants at similar cumulative stomatal ozone uptake.

443 Simulations of stomatal conductance and ozone uptake to Norway spruce saplings in open-top chambers
P.E. KARLSSON, H. PLEIJEL, G. PIHL KARLSSON, E.L. MEDIN, L. SKÄRBY (Sweden)
The comparison between modelled and measured rates of stomatal ozone uptake in Norway spruce indicates the importance of long-term memory-effects in trees exposed to episodic drought stress.

453 An ozone flux–response relationship for wheat
H. PLEIJEL, H. DANIELSSON, G.P. KARLSSON, J. GELANG, P.E. KARLSSON, G. SELLDÉN (Sweden)
The yield of wheat in different ozone treatments in open-top chambers is directly related to the cumulative stomatal ozone uptake during the grain-filling period, which provides a consistent relationship between ozone exposure and relative grain yield.

463 Difference in ozone uptake in grassland species between open-top chambers and ambient air
S. NUSSBAUM, J. FUHRER (Switzerland)
In open-top chambers, ozone uptake differs between species because of specific reactions to chamber conditions, which suggests that ozone effects on species mixtures differ systematically between open-top chambers and the field.

473 Ozone exposure–response relationships for biomass and root/shoot ratio of beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*), Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*)
W. LANDOLT, U. BÜHLMANN, P. BLEULER, J.B. BUCHER (Switzerland)
Long-term exposure to elevated ozone causes a reduction in biomass and root/shoot ratios in different forest tree species, with the larger effects occurring in deciduous as compared to coniferous species.

479 Impact of increased springtime O_3 exposure on Scots pine (*Pinus sylvestris*) seedlings in central Finland
J. UTRIAINEN, T. HOLOPAINEN (Finland)
High springtime ozone concentrations in Finland increase the cumulative effects of ozone on Scots pine during long-term exposures, but under current climatic conditions their immediate effects are small.

489 Visible and microscopic injury in leaves of five deciduous tree species related to current critical ozone levels
M.S. GÜNTHARDT-GOERG (Switzerland), C.J. McQUATTIE (USA), S. MAURER, B. FREY (Switzerland)

501 Beech (*Fagus sylvatica*) response to ozone exposure assessed with a chlorophyll *a* fluorescence performance index
A.J. CLARK, W. LANDOLT, J.B. BUCHER, R.J. STRASSER (Switzerland)
A chlorophyll a performance index obtained from fluorescence analysis correlates to visual injury and biomass loss caused by ozone, and thus could be used for the large-scale monitoring of tree vitality.

509 Effects of ozone exposure in open-top chambers on poplar (*Populus nigra*) and beech (*Fagus sylvatica*): a comparison
K. BORTIER, L. DE TEMMERMAN, R. CEULEMANS (Belgium)
New experimental data confirm the relationship between ozone exposure (AOT40) and biomass production in different tree species, and they confirm that the growth response to ozone is larger in fast-growing as compared to slow-growing species.

517 Phenological weighting of ozone exposures in the calculation of critical levels for wheat, bean and plantain
G. SOJA (Austria), J.D. BARNES (UK), M. POSCH (The Netherlands), K. VANDERMEIREN (Belgium), H. PLEIJEL (Sweden), G. MILLS (UK)
Weighting factors are proposed which can be applied to the ozone exposure index AOT40 in order to account for changes in ozone sensitivity during different stages of crop development.

525 Response to ambient ozone of two white clover (*Trifolium repens* L.cv. "Regal") clones, one resistant and one sensitive, grown in a Mediterranean environment
L. POSTIGLIONE, M. FAGNANO, G. MEROLA (Italy)
Ambient ozone levels in southern Italy cause a significant decrease in the biomass production of a sensitive white clover clone which differs in leaf morphology and water use from a more resistant clone.

533 Development of a multi-factor model for predicting the effects of ambient ozone on the biomass of white clover
G. MILLS, G. BALL, F. HAYES (UK), J. FUHRER (Switzerland), L. SKÄRBY (Sweden), B. GIMENO (Spain), L. DE TEMMERMAN (Belgium), A. HEAGLE (USA), Members of the ICP Vegetation programme
Artificial neural network models applied to biomass data for two white clover clones obtained from different European sites reveal possible interactions between ozone effects, temperature and levels of nitrogen oxides.

543 Contents of Volume 109

IV Instructions to Authors

CONTENTS OF VOLUME 110

Number 1

Commentary

1 Mercury in the traditional diet of indigenous peoples in Canada
H.M. CHAN, O. RECEVEUR (Canada)
Marine mammals were identified as the greatest source of dietary mercury.

Research Papers

3 Evaluation of heavy metal availability in polluted soils by two sequential extraction procedures using factor analysis
I. MAIZ, I. ARAMBARRI, R. GARCIA, E. MILLÁN (Spain)
Cd, Cu and Zn labile levels were related to total metal grass contents.

11 Analysis of air pollution in two major Korean cities: trends, seasonal variations, daily 1-hour maximum versus other hour-based concentrations, and standard exceedances
W.K. JO, I.H. YOON, C.W. NAM (South Korea)
Seoul, South Korea, had higher incidence of carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide than did Taegu.

19 Relationship between leaf life-span and photosynthetic activity of Quercus ilex in polluted urban areas (Rome)
L. GRATANI, M.F. CRESCENTE, M. PETRUZZI (Italy)
Phenotypic plasticity allowed Quercus ilex *to adapt to urban pollution.*

29 PCBs, DDTs and methyl sulphone metabolites in various tissues of harbour porpoises from Swedish waters
K. KARLSON, R. ISHAQ, G. BECKER, P. BERGGREN, D. BROMAN, A. COLMSJÖ (Sweden)
Concentrations of contaminants may be distributed unevenly in blubber, depending on the animal.

47 Suitability of process-based tree growth models for addressing tree response to climate change
J.V.H. CONSTABLE, A.L. FRIEND (USA)
Current tree growth models appear to be reliable integrators of environmental effects on individual tree processes.

61 Comparison of heavy metal bioaccumulation in freshwater molluscs of urban river habitats in Vienna
C. GUNDACKER (Austria)
Freshwater bivalve and gastropod species of molluscs behaved differently as bioindicators of heavy metals.

73 Differences in the responses of native and transplanted mosses to atmospheric pollution: a possible role of selenium
J.A. FERNÁNDEZ, A. CARBALLEIRA (Spain)
*When comparing responses of native versus transplanted moss (*Scleropodium purum*) to a thermal power plant, high levels of selenium were found in native mosses, indicating adaptation.*

79 Polycyclic aromatic hydrocarbons and polychlorinated biphenyls in forest soils: depth distribution as indicator of different fate
M. KRAUSS, W. WILCKE, W. ZECH (Germany)
The fate of PAHs in forest soils is markedly different from that of PCBs.

89 Acid rain and acidification in China: the importance of base cation deposition
T. LARSSEN (Norway), G.R. CARMICHAEL (USA)
The present, historic and future deposition of sulfur and calcium in China is estimated, and possible effects on soils and forests are discussed by application of a dynamic soil acidification model.

103 The role of algae (*Isochrysis galbana*) enrichment on the bioaccumulation of benzo[a]pyrene and its effects on the blue mussel *Mytilus edulis*
O.S. OKAY (Turkey), P. DONKIN, L.D PETERS, D.R LIVINGSTONE (UK)
An alga containing benzo[a]pyrene was fed to the common mussel Mytilus edulis *to study transfer of organic contaminants in a simulated food chain.*

115 Effect of soil on microbial responses to metal contamination
M. KHAN, J. SCULLION (UK)
The effect of the treatments on microbial and extractable indices was greatest in loam soils.

127 Relationship between indoor and outdoor carbonaceous particulates in roadside households
K. FUNASAKA, T. MIYAZAKI, K. TSURUHO, K. TAMURA, T. MIZUNO, K. KURODA (Japan)
Fine elemental carbon in indoor air was significantly correlated to that in outdoor air.

135 Ecotoxicity revealed in parasite communities of *Sigmodon hispidus* in terrestrial environments contaminated with petrochemicals
B.C. FAULKNER, R.L. LOCHMILLER (USA)
Differences in community structure indicate that host–parasite relationships can be useful in monitoring community-level impacts of contamination

147 Dimethylsulfide and its oxidation products in coastal atmospheres of Cheju Island
K.-H. KIM, G. LEE, Y.P. KIM (South Korea)
Concentrations of dimethylsulfide in air were measured from coastal areas in Korea from September 1997 to April 1998.

157 Determination and analysis of distribution coefficients of ^{137}Cs in soils from Biscay (Spain)
C. ELEJALDE, M. HERRANZ, F. LEGARDA, F. ROMERO (Spain)
The distribution coefficient of radiocaesium was determined in soils from Biscay, Spain.

165 The fate and mobility of copper from chemical root control barriers in soil and leachate
S. KOSUTA, C. HAMEL (Canada)
Copper from treated nursery containers was deposited into the soil.

171 Distribution of Pb, Cd and Ba in soils and plants of two contaminated sites
J. PICHTEL, K. KUROIWA, H.T. SAWYERR (USA)
Soil and plant tissue samples were analyzed from transects in two heavily contaminated areas.

179 Arsenic contamination in wood mice (*Apodemus sylvaticus*) and bank voles (*Clethrionomys glareolus*) on abandoned mine sites in southwest Britain
B.V. ERRY, M.R. MACNAIR, A.A. MEHARG, R.F. SHORE (UK)
This paper reports the levels of arsenic contamination in small mammals living on historically contaminated mine sites and discusses factors causing their variability.

189 **Selected bibliography**

Number 2

Commentary

193 Ultraviolet-B radiation, ozone and plant biology
S.V. KRUPA (USA)
Some plant scientists believe that increased UV-B at the surface will also generate more ozone. The underlying rationale does not appear to be wholly correct.

Research Papers

195 Spatial variation of heavy metals in surface sediments of Hong Kong mangrove swamps
N.F.Y. TAM, Y.S. WONG (Hong Kong)
Anthropogenic inputs are the main sources of heavy metal contamination in Hong Kong mangrove wetlands.

207 Mussel Watch: a review of Cu and other metals in various marine organisms in Taiwan, 1991–98
M.-S. JENG, W.-L. JENG, T.-C. HUNG, C.-Y. YEH, R.-J. TSENG, P.-J. MENG, B.-C. HAN (Taiwan)
Mussels and oysters were especially useful in monitoring trace elements in the marine environment around Taiwan.

217 Effects of pre-exposure to ultraviolet-B radiation on responses of tomato (*Lycopersicon esculentum* cv. New Yorker) to ozone in ambient and elevated carbon dioxide
X. HAO, B.A. HALE, D.P. ORMROD, A.P. PAPADOPOULOS (Canada)
Pre-exposure to enhanced UV-B mitigated ozone damage to leaf photosynthesis at elevated carbon dioxide concentrations.

225 Environmental control of stomatal conductance in forest trees of the Great Smoky Mountains National Park
M.C. PATTERSON, L. SAMUELSON, G. SOMERS, A. MAYS (USA)
Ozone uptake by stomata of large forest trees was reduced by low soil moisture.

235 Chemical response of transplanted lichen *Canomaculina pilosa* to different emission sources of air pollutants
C.M. GONZÁLEZ, M.L. PIGNATA (Argentina)
Transplants of the lichen Canomaculina pilosa *responded primarily to emissions from industries.*

243 Analytical method using gas chromatography and ion trap tandem mass spectrometry for the determination of *S*-triazines and their metabolites in the atmosphere
N. SAURET, M. MILLET, P. HERCKES, P. MIRABEL, H. WORTHAM (France)
A highly selective method was developed to detect triazines and their degradation products in gaseous and particulate phases.

253 A generic model of human lifetime exposure to persistent organic contaminants: development and application to PCB-101
R.E. ALCOCK, A.J. SWEETMAN, C.-Y. JUAN, K.C. JONES (UK)
A model was developed to predict the lifetime burden of PCB-101 for individuals born between 1920 and 1980.

267 A long-term study of vitamin A and polychlorinated hydrocarbon levels in otters (*Lutra lutra*) in south west England
V.R. SIMPSON, M.S. BAIN, R. BROWN, B.F. BROWN, R.F. LACEY (UK)
Vitamin A deficiency may have been common in otter populations in Britain and may have influenced declines.

277 Removal of toxic metals from solution by leaf, stem and root phytomass of *Quercus ilex* L. (holly oak)
M.N.V. PRASAD, H. FREITAS (Portugal)
Holly oak phytomass was useful as a biofilter of toxic trace metals.

285 Heavy metal geochemistry of saltmarsh soils from the Ría of Ortigueira (mafic and ultramafic areas, NW Iberian Peninsula)
X.L. OTERO (Spain), M.A. HUERTA-DIAZ (Mexico), F. MACÍAS (Spain)
The distribution of heavy metals in various fractions was determined in saltmarsh soils, sediments and sludge.

297 The history of mercury emissions from fuel combustion in Maritime Canada
E.M. SUNDERLAND, G.L. CHMURA (Canada)
An inventory of historical emissions of mercury from combustion in Maritime Canada is presented.

307 Reproductive success and chlorinated hydrocarbon contamination in tree swallows (*Tachycineta bicolor*) nesting along rivers receiving pulp and paper mill effluent discharges
M.L. HARRIS, J.E. ELLIOTT (Canada)
Chlorinated hydrocarbon contamination in tree swallows and effects on population reproductive success were determined.

321 Leaf pack breakdown and macroinvertebrate colonization: bioassessment tools for a high-altitude regulated system?
S.M. NELSON (USA)
Differences in aquatic macroinvertebrate assemblages colonizing leaf packs were noted in relation to distance from a metals point source.

331 Pesticides in rainfall in Europe
I.G. DUBUS, J.M. HOLLIS, C.D. BROWN (UK)
Lindane was the most commonly detected pesticide.

345 Atmospheric input of elements to forest ecosystems: a method of estimation using artificial foliage placed above rain collectors
A. STACHURSKI, J.R. ZIMKA (Poland)
Artificial foliage placed above rain collectors was an effective way to simulate trends in net canopy exchange of forest trees.

357 Historical record and sources of polycyclic aromatic hydrocarbons in core sediments from the Yangtze Estuary, China
M. LIU (People's Republic of China), P.J. BAUGH, S.M. HUTCHINSON (UK), L. YU, S. XU (People's Republic of China)
The PAH profile pattern reflects the influence of a nearby sewage outlet.

367 Book review

369 **Selected bibliography**

Number 3

The *Environmental Pollution* Kenneth Mellanby Award 2000

373 Introduction
W.J. MANNING (USA)

375 Bioaccumulation of persistent organic chemicals: mechanism and models
D. MACKAY, A. FRASER (Canada)

Regular Papers

393 Constructed wetlands for mitigation of atrazine-associated agricultural runoff
M.T. MOORE, J.H. RODGERS Jr., C.M. COOPER, S. SMITH Jr. (USA)
Buffer travel distances of 100–280 m were shown to be necessary to efffectively manage atrazine runoff.

401 Determination of Q1, an unknown organochlorine contaminant, in human milk, Antartic air, and further environmental samples
W. VETTER, L. ALDER (Germany), R. KALLENBORN, M. SCHLABACH (Norway)
A new organochlorine component of unknown origin has been identified in seal blubber samples.

411 Trace metals and organochlorines in sediments near a major ocean outfall on a high energy continental margin (Sydney, Australia)
C. MATTHAI, G.F. BIRCH (Australia)
Sewage effluent is efficiently dispersed and concentrations of trace metals and organochlorines are low in surficial sediments.

425 The influence of feeding, photoperiod and selected solvents on the reproductive strategies of the water flea, *Daphnia magna*
L. ZHANG, K.N. BAER (USA)
Reproductive strategies of Daphnia magna are affected by phenological, dietary and exogenous chemical cells.

431 Marine macroalgal community structure, metal content and reproductive function near an acid mine drainage outflow
A.D. MARSDEN, R.E. DeWREEDE (Canada)
Evidence is presented that acid mine drainage affects the structure of marine algal communities.

441 The heavy metal content of the teeth of the bank vole (*Clethrionomys glareolus*) as an exposure marker of environmental pollution in Poland
J. APPLETON, K.M. LEE (UK), K. SAWICKA KAPUSTA, M. DAMEK (Poland), M. COOKE (UK)
The teeth of small mammals can be sensitive and reliable biomonitors of metals.

451 Does salt water intrusion constitute a mercury contamination risk for coastal fresh water aquifers?
G. PROTANO, F. RICCOBONO, G. SABATINI (Italy)
Mercury pollution has been coupled with progressive salt water intrusion along coastal aquifers in Tuscany.

459 Widespread contamination by *tris*(4-chlorophenyl)methane and *tris*(4-chlorophenyl)methanol in cetaceans from the North Pacific and Asian coastal waters
T. BINH MINH, M. WATANABE, S. TANABE, N. MIYAZAKI (Japan), T.A. JEFFERSON (USA), M.S. PRUDENTE (Philippines), A. SUBRAMANIAN, S. KARUPPIAH (India)
Accumulation of TCPMe and TCPMOH in cetaceans was similar to DDTs.

469 Trace elements, organochlorines, polycyclic aromatic hydrocarbons, dioxins, and furans in lesser scaup wintering on the Indiana Harbor Canal
T.W. CUSTER, C.M. CUSTER, R.K. HINES, D.W. SPARKS (USA)
Higher levels of tissue contamination with trace elements, PCBs and PAHs were found in lesser scaup in heavily polluted Indiana Harbor Canal, East Chicago, IN, USA.

483 Multi-element analysis of road-deposited sediment in an urban drainage basin, Honolulu, Hawaii
R.A. SUTHERLAND, C.A. TOLOSA (USA)
Road-deposited sediments contain potentially toxic elements, including Pb.

497 Influence of soil pH on the fractionation of Cr, Cu and Zn in solid phases from a landfill site
G. MUÑOZ-MELÉNDEZ, A. KORRE, S.J. PARRY (UK)
pH in a compacted clay liner, in a new landfill cell, was variable and affected metal reactivity.

505 Effects of point-source PCB contamination on breeding performance and post-fledging survival in the dipper *Cinclus cinclus*
S.J. ORMEROD, S.J. TYLER (UK), I. JÜTTNER (Germany)
Results presented here illustrate the value of congener-specific analysis of bird's eggs in indicating local PCB sources.

515 Relation of enhanced Pb solubility to Fe partitioning in soils
Y. DONG, L.Q. MA, R.D. RHUE (USA)
Quantitative data are provided to help determine the relationship between Pb solubility and Fe partitioning in soils.

523 Organochlorine and organophosphorus pesticide residues in the Atoya river basin, Chinandega, Nicaragua
J.A.A. CASTILHO (Nicaragua), N. FENZL (Brazil), S.M. GUILLEN (Nicaragua), F.S. NASCIMENTO (Austria)
Variations in the concentrations of organochlorine and organophosphorus pesticide residues were determined in river waters and sediments by season of the year.

535 Fate of nitrogen during composting of chicken litter
S.M. TIQUIA (USA), N.F.Y. TAM (People's Republic of China)
Composting reduced the value of chicken litter as a N fertilizer.

I Contents of Volumes 107–110

XVIII Instructions to Authors